(1) Election/Restrictions

Applicants affirm the election made without traverse during a telephone conversation with Mr. Dan Morris on April 25, 2002 to prosecute the invention of generic claims 1-4 and the first species encompassed by claims 5-13. However, if a generic claim is finally held to be allowable, Applicant requests that the claims drawn to the first and second species be rejoined.

New claim 30 is hereby identified to belong to the First Species group.

(2) Claim Rejections- 35 USC § 112

Claims 5-13 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Office Action states that claim 5 recites the limitation "said patterned and unpatterned regions" in lines 10 and 11 without sufficient antecedent basis for this limitation in the claim.

Applicants have amended claim 5 to include such antecedent basis.

(3) Claim Rejections - 35 USC § 102

Claims 1, 2 and 4-11 are rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,512,131 to Kumar et al. (here after Kumar et al.).

Regarding claim 1, Kumar et al. disclose a method of forming a patterned thin film comprising the steps of;

(1) providing a substrate having a patterned layer of a self-assembled monolayer (SAM) thereon; and

(2) depositing **a second self-assembled monolayer (SAM)** thereover.

In contrast to Kumar et al., claim 1 defines a method in which a thin film material is deposited on a surface of a substrate having thereon a patterned underlayer of a self-assembled monolayer.

For example, the self-assembled monolayer is prepared from an organic molecular species, which has (see, for example, claims 9 and 10):

(1) a functional head group selected from: a phosphine, phosphonic acid, carboxylic acid, thiol, epoxide, amine, imine, hydroxamic acid, phosphine oxide, phosphite, phosphate, phosphazine, azide, hydrazine, sulfonic acid, sulfide, disulfide, aldehyde, ketone, silane, germane, arsine, nitrile, isocyanide, isocyanate, thiocyanate, isothiocyanate, amide, alcohol (hydroxyl), selenol (selenide), nitro, boronic acid, ether, thioether, carbamate, thiocarbamate, dithiocarbamate, dithlocarboxylate, xanthate, thioxanthate, alkylthiophosphate, dialkyldithiophosphate, or a combination thereof; and

(2) a functional tail group selected from the group consisting of: a hydrocarbon, partially halogenated hydrocarbon, fully halogenated hydrocarbon, phosphine, phosphonic acid, carboxylic acid, thiol, epoxide, amine, imine, hydroxamic acid, phosphine oxide, phosphite, phosphate, phosphazine, azide, hydrazine, sulfonic acid, sulfide, disulfide, aldehyde, ketone, silane, germane, arsine, nitrile, isocyanide, isocyanate, thiocyanate, isothiocyanate, amide, alcohol (hydroxyl), selenol (selenide), nitro, boronic acid, ether, thioether, carbamate, thiocarbamate, dithiocarbamate, dithlocarboxylate, xanthate, thioxanthate, alkylthiophosphate, dialkyldithiophosphate, or a combination thereof.

The thin film material in claim 1 is not a self-assembled monolayer. Instead, the thin film material is clearly described to be as follows (see, for example, claim 23):

"an organic molecule, a short-chain organic oligomer, a long-chain organic polymer, a photoresist, an organic-inorganic hybrid material, a metallo-organic complex, a nanoparticle of metal, a nanoparticle of metal oxide, a nanoparticle of semiconductor, a silica particle, an inorganic salt, and a mixture thereof."

The method of Kumar et al. always deposits **a second self-assembled monolayer (SAM)** over a first self-assembled monolayer (SAM), a feature that is not present in instant claim 1.

Accordingly, claim 1, and claims 2 and 4-11, which depend from claim 1, clearly distinguish over Kumar et al. Therefore, the rejection of claims claim 1, 2 and 4-11 under 35 U.S.C. § 102(b), as being anticipated by Kumar et al. should be withdrawn.

(4) Claim Rejections - 35 USC § 103

Claim 3 is rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,512,131 to Kumar et al.

The Office Action concedes that Kumar et al. does not specifically disclose, as per applicant claim 3, that the substrate can be an irregularly shaped substrate, but states that it would have been obvious to one of ordinary skill in the art at the time of invention to utilize the method of Kumar et al. to pattern a substrate having an irregular shape; i.e., a nonplanar surfaces given the teaching that the stamp may be chosen to be elastic, such that the stamping surface 26 may closely conform to irregularities in a surface (column 7, lines 30-41).

To establish a *prima facie* case of obviousness, all the elements of a claim must be present or described in a cited reference with a suggestion to modify the reference to arrive at the claimed invention. Thus, a teaching or suggestion of how to modify the reference to arrive at the claimed invention is one of the essential requirements that

must be met to establish a *prima facie* case of obviousness (see MPEP § 2142 and In re Rouffet, 47 USPQ 2d at 1457-1458).

The method of Kumar et al. always deposits **a second self-assembled monolayer (SAM)** over a first self-assembled monolayer (SAM), a feature that is not present in instant claim 3.

There is no teaching or suggestion in Kumar et al. to modify the method of Kumar et al. **by depositing a thin film material on a surface of a substrate having thereon a patterned underlayer of a self-assembled monolayer** instead of **depositing a second self-assembled monolayer (SAM) over a first self-assembled monolayer (SAM).**

Accordingly, the criteria for establishing a *prima facie* case of obviousness have not been met (see MPEP 2143, citing In Re Vaeck, 947 F.2d 488, 20 USPQ 2d 1438 (Fed. Cir. 1991)). Therefore, the rejection of claim 3 under 35 U.S.C. § 103(a), as being obvious over U.S. Patent No. 5,512,131 to Kumar et al. should be withdrawn.

(5) Claim Rejections - 35 USC § 103

Claim 13 is rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,512,131 to Kumar et al. in view of U.S. Patent No. 6,020,047 to Everhart and U.S. Patent No. 5,059,258 to Wefers et al.

The Office Action incorrectly states that Kumar et al. "disclose a method for the formation of a patterned thin film on a substrate having a patterned SAM underlayer". Kumar et al. **does not** disclose a method for the formation of a patterned thin film on a substrate having a patterned SAM underlayer. Instead, Kumar et al. discloses **depositing a second self-assembled monolayer (SAM) over a first self-assembled monolayer (SAM) and further.** Further, Kumar et al. **does not** disclose that the organic molecular species comprises octadecylphosphonic acid.

Wefers et al. discloses the use of phosphonic species in the formation of SAMs on oxidized metal substrates. However, Wefers et al. **does not** disclose a method for the formation of **a patterned thin film on a substrate having a patterned SAM underlayer.**

Everhart discloses a film with patterned self-assembling monolayers on a polymer film coated with a metal alloy. However, Everhart **does not** disclose a method of forming **a patterned thin film on a substrate having a patterned SAM underlayer.**

Thus, neither Kumar et al. nor Wefers et al. nor Everhart, either alone, or in combination, teach or suggest all the elements of the instant claim 13, nor do they teach or suggest how to modify the other reference to arrive at the claimed invention. Without such a teaching or suggestion, a person of ordinary skill in the art would not be motivated to combine the references. Due to the dependence of claim 13 from claim 1, even if the references were combined, the combination still does not have all the elements of claim 13, namely **forming a patterned thin film on a substrate having a patterned SAM underlayer**.

The combination (1) does not have all the elements of claim 13, (2) does not provide motivation to modify the other reference to arrive at the claimed invention and (3) does not provide a reasonable expectation of success if the references were combined. Thus, none of the essential requirements are met to establish a *prima facie* case of obviousness (see MPEP § 2142 and In re Rouffet, 47 USPQ 2d at 1457-1458).

Therefore, the rejection of claim 13 under 35 U.S.C. § 103(a), as being obvious over U.S. Patent No. 5,512,131 to Kumar et al. in view of U.S. Patent No. 6,020,047 to Everhart and U.S. Patent No. 5,059,258 to Wefers et al.

Based on the above, applicants respectfully request reconsideration of the present application, withdrawal of the 35 U.S.C. §112, second paragraph rejection, the

35 U.S.C. §102 (b) rejection, the 35 U.S.C. § 103(a) rejection and allowance of claims 1-13 and 30.

Accordingly, an early indication of the allowability of all pending claims by issuance of a Notice of Allowability is earnestly solicited.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Claims:

Claim 5 was amended as follows:

5. (Amended) The method of claim 1, wherein said self-assembled monolayer has patterned and unpatterned regions and is prepared by a process comprising the steps of:

providing a stamp having a surface;

coating said surface of said stamp with an organic molecular species to produce a coated surface, said organic molecular species having a head functional group capable of interacting with said surface of said substrate, and a tail group for chemical differentiation of said patterned and unpatterned regions of said coated surface;

placing said coated surface in contact with said substrate for a length of time sufficient to transfer said self-assembled monolayer of said organic molecular species from said stamp to said substrate; and

removing said stamp.

The following new claim was added:

-- 30. A method of forming a patterned thin film comprising:

depositing a thin film material on a surface of a substrate having thereon a patterned underlayer of a self-assembled monolayer;

wherein said self-assembled monolayer is prepared by a process comprising the steps of: providing a stamp having a surface; coating said surface of said stamp with an organic molecular species to produce a coated surface, said organic molecular species having a head functional group capable of interacting with said surface of said substrate, and a tail group for chemical differentiation of said patterned and unpatterned regions of said coated surface; placing said coated surface in contact with said substrate for a length of time sufficient to transfer said self-assembled monolayer

of said organic molecular species from said stamp to said substrate; and removing said stamp; and

wherein said organic molecular species comprises (tridecafluoro- 1,1,2,2-tetrahydrooctyl)trichlorosilane. --